DOCUMENT RESUME

ED 109 859 EC 073 351

AUTHOR Haupt, Edward J.; Le febvre, Andrienne
TITLE Teaching Procedures for Neurologically Impaired and Retarded Children. Final Report.
INSTITUTION Bergen Center for Child Development, Englewood, N.J.
SPONS AGENCY Office of Education (DHEW), Washington, D.C. Regional Research Program.
PUB DATE Jun 73
GRANT OEG 2-2 2B806
NOTE 33p.

EDRS PRICE MF-$0.76 HC-$1.95 PLUS POSTAGE
DESCRIPTORS Adolescents; *Auditory Discrimination; Case Studies; Exceptional Child Education; *Nonverbal Communication; *Receptive Language; *Severely Handicapped; *Teaching Methods

ABSTRACT

A 14-year-old nonverbal severely handicapped boy received instruction in receptive language based on learning a "yes-no" indicator response and a variety of basic concepts. The procedures included scaling of preferences for common objects and basic teaching procedures for a "yes-no" indicator response to the question, "Do you like this?" Additional procedures were concerned with auditory discrimination and object discrimination. The scaling and "yes-no" discrimination procedures were successfully performed. The auditory discrimination revealed difficulty in the task analysis, resulting in the elimination of correct unprompted responses. Auditory discrimination was found to be a more basic task than previously indicated. (Appended are three sample activity descriptions, including making a "yes" and "no" response.) (Author/CL)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED109859

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Final Report

Project No. 2B806
Grant No. OEG 2-2-2B806

Teaching Procedures For Neurologically Impaired And Retarded Children

Edward J. Haupt-Project Director
Adrienne Lefebvre- Project Co-ordinator

Bergen Center for Child Development, Inc.
245 Tenafly Road
Englewood, New Jersey 07631

June, 1973

The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
National Center for Educational Research and Development

(Regional Research Program)

EC 073 351

AUTHOR'S ABSTRACT

A study to teach receptive language based on learning a "yes-no" indicator response and a variety of basic concepts was implemented. The procedures included scaling of preferences for common objects and basic teaching procedures for a "yes-no" indicator response to the question, "Do you like this?" Additional procedures were concerned with auditory discrimination and object discrimination. The scaling and "yes-no" discrimination procedures were successfully performed. The auditory discrimination revealed difficulty in the task analysis resulting in the elimination of correct unprompted responses. Auditory discrimination appears to be a more basic task than previously indicated.

INTRODUCTION

Some children do not learn to speak or to use any system of behavior that can be called language. When a child fails to learn any such system of behavior, the child may be deficient in the ability to form the responses required by the language, the child may have a sensory deficit that does not permit the child to form the required discriminations, or the child may have a variety of behaviors which interfere with his learning of language.

When a child appears to lack the skills required to form the production of oral responses, the child may learn an alternative system of responses to indicate what he understands and what he wishes to express. Sign language, for deaf children, is one such alternative. Communication boards (JSHR, 1973 and Izzard, McNaughton, et. al., 1973) are another alternative for children with cerebral palsy.

When a child is deaf, he has a clear deficit of the sensory organs required to form the discriminations required by speech. Often, children with such a deficit are taught sign language, which requires visual discriminations, to bypass this sensory deficit. Children with behavior incompatible to speech can be taught to imitate speech and to understand more complex skills directly, so they do not require teaching procedures specific to either sort of deficit.

When no sensory deficit is apparent, and the child cannot be trained to produce a wide range of appropriate responses, another possibility occurs. That possibility is to reduce the range of required responses, say to a touching response, or to a "yes-no" response, in order to bypass the problems of expanding the variety of responses available. This possibility defines a language which is purely receptive. In such a purely receptive language system, the child may only need to make a pointing response or a touching response to indicate which of two, or many choices is correct. Another reason that a purely receptive language system is attractive is that receptive language often appears to be simpler than expressive language. Lenneberg's (1963) case study of understanding without speech points in this direction.

Bricker and Bricker (1970), Guess (1969), and Baer and Guess (1972), among others have provided training procedures for purely receptive language in vocabulary, learning of singular and plural, and adjective inflections, respectively. None of these procedures had been used specifically because they were thought to be especially effective language training devices nor had any of them developed a language training curriculum which was specifically related to use of receptive language. However, it was apparent, from all of these studies, that the unique feature of receptive language had nothing to do with the stimulus dimensions which had to be attended to, but that receptive language was unique in that it only required a single response (touching a book or a doll, for objects, and pointing to the singular, plural, etc. for nouns and adjective inflections). Such devices are exemplified, even at the highest levels of language use, by a True-False examination

question in which the student is required to point to, or circle the answer (T or F) which describes the nature of the statement in front of him.

A receptive language system may seem especially appropriate when there is evidence that the child can hear, has good visual discrimination, but has no speech. Further, when attempts to teach vocal imitative responses have failed, as (see Larsen and Bricker, 1968 for such techniques the simplification of language to a single response seems appropriate.

The project reported here was an attempt to develop a language curriculum which was purely receptive for a child who had failed verbal imitation training. The sequence of objectives in the curriculum was modeled after that used in Distar (see Bereiter and Englemann, 1966 for a similar sequence), and the response was specified to be entirely receptive.

A "yes-no" response was chosen as the basic indicator for receptive language. The "yes-no" response was based on a discrimination of preference with a "yes" response to the question "Do you like this?" indicating liking of an object and a "No" response indicating dislike. The responses required were the movement of a block towards or away from the child's body. The dimension of preference was based on a paired-comparison scaling of objects that the subject was known to like and dislike.

The first major language component followed the establishment of this discrimination of preference. The major language component was the establishment of a conceptual receptive vocabulary (Bricker and Bricker, 1970). This receptive vocabulary was programmed in two parts, the first of which served as an auditory discrimination task. In this task, only one object was presented. Then the subject was trained to answer "yes" to the question, "Is this a _____?" and "No" to a question with the name of some other object inserted in the same slot. This task is both a rote-receptive vocabulary and an auditory discrimination. The procedure was also designed to handle more than one example of the named object as well as a variety of other objects.

The following project attempted to show that such a language system could be established in a child who had failed in all previous efforts of language training.

METHOD

Subject:

The subject was 14 years old during the major portion of the study since he had his birthday ten days after the study commenced. He was placed at the Bergen Center for Child Development in September of 1971, after a variety of educational placements in his own school system, including classes for the communication handicapped.

He was born following an uncomplicated pregnancy. Two of his siblings died from cystic fibrosis, and one of his six living siblings has cystic fibrosis which is medically controlled through inhalative therapy and medication. The remaining siblings have shown normal growth and achievement for their environment.

During his first year of development, his mother noted that milestones were normal except for the following: difficulty in chewing which produced gagging on coarse foods, lack of response when mother came towards the crib upon awakening from a nap, no play with or response to toys and objects, and rocking in the crib and head-banging behavior. The subject also evidenced convergent strabimus and myopia, and inverted foot (equinus vargus) at 5 months of age. The orthopaedic problem was corrected by a cast and pronator shoes.

Most developmental stages were retarded. He walked at 18 months of age, never spoke other than approximations of "ma-ma" and "da-da" sounds at 11 months and he was not toilet trained until 5½ years of age.

During his 14 years, he gradually acquired a simple repertoire of home tasks such as picking eating utensils from the drawer, loading the dishwasher, folding clothes and keeping the room neat and orderly. He was observed to play only with toys that he was carefully trained to play with in the home. Very little attention was paid to toys given as presents.

He was given an intensive neurological examination at age 10 with the results indicating a diffuse irregularity in his E.E.G. and that anti-epileptic drugs had stabilized his seizures. His poor motor-coordination and his inability to protrude his tongue or chew a lollipop indicated lingual apraxie. There was also a notation of inability to abduct the right eye (strabismus).

Since entrance to the Bergen Center for Child Development in 1971, he was given imitation training according to the procedures in Larsen and Bricker (1968). The gross-motor and fine-motor (eye-hand) imitation training was successful. However, imitation of mouth placement was unsuccessful. This seemed to be associated with the lingual apraxia, indicated by the neurological examination.

The subject was also given training on the Russell Perceptual Sorting Kit (Russell, 1967). On the lowest level, which required discrimination of right-left direction, he did not perform correctly from simple modeling of correct answers. As a result, he was trained on contrasting pairs of cards until he was able to work with the entire set of 10 card forms. There was no noticeable difficulty in accomplishing such training. He also demonstrated evidence of object discrimination for common objects using the DLM Picture Association Cards.

He was taught to wind the spring of a Fisher-Price music box which was shaped like a phonograph by successive approximations of stronger and stronger turning responses. He consistently preferred one record (Edelweiss) from the set available and would only wind the music box to play this record. He was also taught to build towers of Lego Blocks (1" x 2" x 4") with alternating colored blocks. As a result of this play training, he would play independently with these objects.

He had a long history of inappropriate behaviors including rocking, twirling, leaving assigned places, rubbing his hands against his teeth and his hair and crying. His rocking has been controlled as a result of a negative reinforcement procedure (escape from restraint) and through reinforcement of incompatible behavior (holding hands together is incompatible with rubbing and biting).

During the year of the project the subject was observed to have had a high frequency of colds, and other minor illnesses. He was frequently found to be agitated or disturbed upon arrival at school or to sleep during long periods of the school day. He was also observed to play independently with balls, beanbags, Lego blocks, and even another child's walking prosthesis. He sometimes smiled at his teachers and became distractible by people walking past, something which had not occurred before.

While his early work was concentrated on the lower levels of the Russell Sorting Kit, he later became proficient at higher levels and frequently performed the sorting required with few or no errors.

Apparatus:

The materials used in this series of procedures comprised a variety of simple objects such as foods and toys which the subject was observed to especially like or dislike (such as chocolate chip cookies, which he liked and apples and bananas, which he disliked). The apparatus also included a variety of small toys such as trucks and dolls which were used for auditory discrimination tasks.

A variety of reinforcers, which were changed from time to time, were used as consequences for correct performance on the tasks presented. The reinforcers included chocolate chip cookies, M & M's, applesauce, and fruit juice of various kinds. A stop watch was used to approximately measure the time between each stimulus presentation and the subject's response.

Procedure:

The study included the following segments: (1) a paired comparison procedure for finding relative preference for a variety of common objects, (2) a training procedure for prompting use of indicator responses, and a concurrent discrimination procedure to correlate the indicator responses with the comparisons into a rudimentary "yes-no" discrimination, and (3) rote object-naming procedure used for auditory discrimination training.

Relative preference for common objects: The following procedure is similar to one described by Premack (1971) for finding relative preference for common objects. A list of 20 objects, which included objects that were clearly preferred, not preferred and neutral by the subject, was solicited from the subject's mother. After clarification of the content and a conference with the classroom teachers, a group of 10 objects (M & M's chocolate chip cookies, cards from the Russell Sorting Kit, large Lego blocks, fruit punch, butter cookies, a banana, a toy clown doll, a toy car and an apple) were assembled. All possible pairs of these 10 objects (45 pairs) were formed and the subject was given a chance to interact with both members of each pair for 5 minutes. The total time that the subject was in physical contact with each object was tallied and that object which received more time was rated as preferred for that pair. The pairs were then placed in order by the paired comparison procedure and assigned a rank. The most preferred and the least preferred objects were used as the basis for the concurrent discrimination procedure subsequently used.

"Yes-No" discrimination procedure: The concurrent discrimination procedure in the study was similar to procedures described by Lane (1967) for the training of auditory discrimination. The first part of the above procedure required teaching the appropriate responses and bringing them under appropriate auditory discriminative control. For this study, it was required that the responses be brought under control of the dimension of relative preference for objects which had been established during paired-comparison procedure.

The response selected was chosen because of the non-verbal behavior of the child. The subject was required either to pull a single wooden block towards him or to push the same block away from him. Therefore, the responses were similar to accepting an object (bringing it towards him) or rejecting it (pushing it away from him). The first response required the subject to hear the word "yes", place his hand upon the block, pull it towards him, and lift his hand off the block. The "no" response was similar except the subject was required to hear the word "no", place his hand upon the block, push it away from him, and lift his hand off the block. Additional requirements were added to this sequence later in the study. The subject was required to commence each trial with his hands in his lap and end each trial with hands together in his lap. This prepared him for the onset of the next trial.

Upon completion of training, a concurrent discrimination which contrasted most preferred (chocolate chip cookie) and least preferred (banana), was trained. The procedure used to teach this sequence of behaviors treated the set of movements as an operant sequence (hands together, hands separate, touch block, push (or pull) block, let go of block, and bring hands together in the lap). The sequence was taught by demonstrating each movement of the sequence and saying "do it". This procedure made use of the subject's previous imitation training. Then each imitative prompt was eliminated (faded) starting with the prompt for the final behavior ("hands together"). This is similar to procedures described by Sloane, Harris, and Wolf (1968). The procedures are described in the accompanying appendix as Activity 16A.

In the beginning, the response for each object was trained separately. The training for each object continued until the subject achieved the criterion that 75% of the responses to a 20-trial block, required less than 5 seconds to complete each trial. The separate responses were then presented in shorter blocks of trials that were alternately presented on the same day. At first the blocks were 10 trials long. The blocks were progressively shortened until the "Yes" and the "No" response could be randomly alternated. This is a method similar to the one described by Sherman and Schumaker (1970). The prompt for the correct "yes" and "no" responses were eliminated by gradually lengthening the time between presentations of the object and the verbal prompt ("Yes" or "No").

Training of a conceptual object discrimination: The "yes-no" procedure was used as the basis for an object discrimination procedure. An auditory discrimination procedure was devised to assure that all the required auditory discriminations could be used. The auditory discrimination tasks were similar in format to object discrimination for maximal transfer. The final form of object discrimination was:

> A group of three 4-wheeled objects were presented. An object was pointed to and the subject was asked, "Is this a car?". If the correct response was given, the most preferred food was given.

RESULTS

The 10 objects which were compared by presentation of each possible pair for 5 minutes of free access to the pair, were placed in order from least preferred to most preferred by placing all 45 comparisons in a triangular array in which each object formed a row and a column. Then the relative preference was found by rearranging rows and columns until the fewest number of failures of transitive preference occurred. The resulting order was: (1) chocolate chip cookies, (2) fruit punch, (3) cards from the Russell Perceptual Sorting Kit, (4) large Lego blocks, (5) M & M's, (6) clown doll, (7) toy car, (8) butter cookies, (9) apple, and (10) banana. Several failures of the transitivity relation occurred, but these seemed to be artifacts of the nature of the stimuli and the length of the time for which each pair was presented.

The fruit punch was quickly consumed and the subject became satiated. Because of this rapid satiation, the sorting kit was preferred to the punch during the comparison of the sorting kit and the punch. If the time period for the comparisons had been shorter, the punch, which was quickly consumed, would have been preferred over the chocolate chip cookies. Two cases of no preference occurred. During these comparisons in which no preference was evident, the subject played with neither object. The objects in these pairs (banana--clown doll and banana--butter cookies) were non-preferred objects in the final ranking.

The occurrence of such a nearly complete set of transitive rankings from a child who is incapable of being tested verbally, indicates that such comparisons are a basic characteristic of many organisms, and require only minimal apparatus to function. This strengthens Premack's (1971) case for paired-comparison tests as a basis for determining the reinforcement value of objects.

This paired comparison ranking served as the basis for the "yes-no" discrimination training. Chocolate chip cookies served as the stimulus for the "yes" response and the banana for the "no" response. Single stimulus training of the "yes" response required 5 20-trial training sessions. Training of the "no" response required 3 20-trial training sessions.

Training of mixed presentations of "yes" and "no" presentations by the gradual use of shorter and shorter series of each type of presentation and the gradual withdrawal of prompts for correct answers took several months. Fifty-two 20-trial sessions were required to reach a criterion of 60% unprompted correct responses on trials when the previous stimulus was changed to the alternative one.

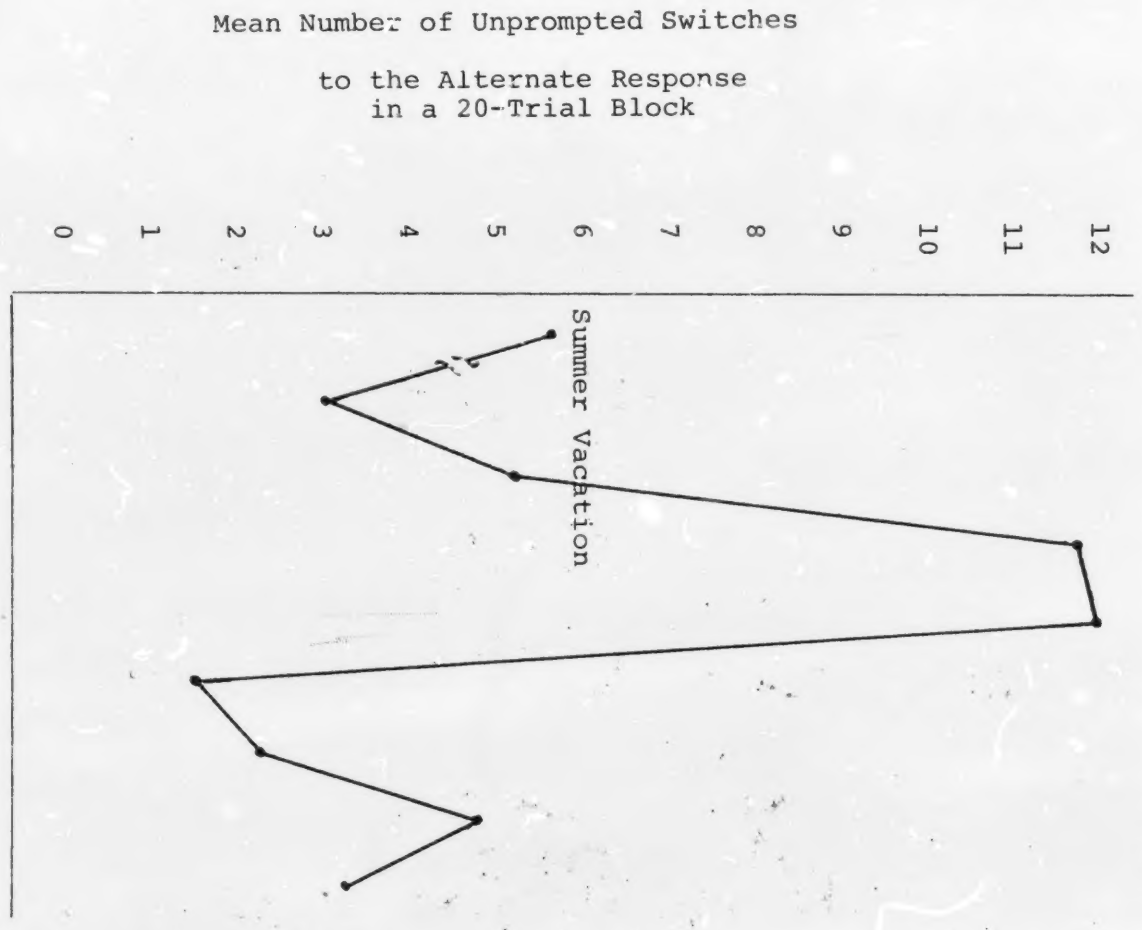
The training of mixed presentations of the separate stimuli for the "yes" response and the "no" response took a very long time. This course of training (by months) is shown in Fig. 1. This figure shows that the subject had shown some improvement in the first month (June) of the program. Much of this improvement was not maintained over the summer. However, the subject improved rapidly in October and November and maintained good performance throughout December.

At the end of October, when it appeared that the subject was performing well on the "yes-no" discrimination, the subject's preferences were tested again. At this time it appeared that the subject's preferences might have shifted somewhat, since several shifts of reinforcers had been necessary. Because the five-minute preferences were stable, and some satiation effects from the long interval had occurred, two-minute presentations of each pair of stimuli were employed. The same set of stimuli were used for ranking this time, with the exception of the toy clown doll, which could not be found. After all the results of the paired comparisons were found, they were again placed in a triangular array to determine the relative rank of each object. The preferences found this time were: (1) chocolate chip cookies, (2) Russell Perceptual Sorting Kit, (3) M & M's, (4) large Lego blocks, (5) punch, (6) whole apple, (7) toy car, (8) banana, and (9) butter cookies. Only two failures of transitive preference occurred in this testing series, even though the presentation time was shorter and the preferences might have been expected to be less consistent. One failure of transitive preference occurred when punch and chocolate chip cookies were compared. This was the second presentation of the chocolate chip cookies in a row, and the subject was presumably thirsty after chewing chocolate chip cookies nonstop for two minutes. The other failure occurred when M & M's and the whole apple were presented together. The subject spent the entire two minutes holding the apple. This time, the scaling produced by the paired-comparison method was easily accomplished and largely consistent with the previous results. Although some changes did occur, the changes can be accounted for almost completely as two simple switches. The preference for punch and M & M's interchanged places, making the two chocolate items (chocolate chip cookies and M & M's) much more similar (first and third rank.) The second change included apple increasing its relative position, although it still appeared to be a non-preferred stimulus, while butter cookies became the least preferred object in the set. The subject has a history of changes in preference for foods, and this change in the results of the paired comparison scaling mirrored these changes.

After this repetition of the preference testing was completed, the training of the "yes-no" discrimination was continued so that the response would still be available.

Figure 1.

Mean number of unprompted switches to the alternate response during the months of the project.


Mean Number of Unprompted Switches
to the Alternate Response
in a 20-Trial Block
0
1
2
3
4
5
6
7
8
9
10
11
12
Summer Vacation
J S O N D J F M A
1972 MONTH 1973

Training on the auditory discrimination component of the object discrimination commenced. This component required the subject to master a series of discriminations in which the subject was faced with one object and asked "Is this a _____?". One word was the cue for the "yes" response, e.g., "truck" for a toy truck. Another word was the cue for the "no" response, e.g., "record player" when the toy truck was presented. The subject completed the first discrimination (truck--record player) in 5 20-trial training sessions which lasted until after Thanksgiving vacation. Then the second discrimination (shirt--table) was begun. The subject reached 80% correct unprompted reversals in 2 20-trial training sessions. Some hesitations appeared when the third auditory discrimination (cow-bag) was presented. Success was slow to arrive, and training continued throughout December. During the course of this training, the subject continued to make many hesitant responses, and it was suspected that he was using some cue from the experimenter's presentation to obtain reinforcement. The hesitant response consisted of pushing the block a little forward, then a little back, etc. until the experimenter reinforced him. In the early part of January this type of responding was transferred to the previously well-established "yes-no" discrimination and resulted in a cessation of correct responding. This decrease is shown in the right-hand part of Fig. 1.

A comparison of the words used in the auditory discrimination task shows that the subject could have used visual rather than auditory cues to find the correct answer for the discrimination. In both the first (truck--record player) and the second (shirt--table), the alternative response has at least two syllables. For each syllable in a spoken word, the mouth of the person opens and closes once. To discriminate a two or more syllable word from a one syllable word, the subject must only discriminate the visual pattern of mouth opening one time from the visual pattern of mouth opening two or more times. This cue was no longer present in the last auditory discrimination (cow--bag) that the subject failed to master. This particular pattern of failure suggests the possibility of a real deficit in auditory discrimination when sounds which are not pure tones are used.

The result of this unforseen failure was a return to the training of the "yes-no" response. The response required by the "yes-no" response was analyzed into a series of component parts which were described in the method. These parts included holding hands together, touching the clock, moving it, letting the block go, and returning to the hands together position. The hands together position was included in the sequence partly because it was a teachable response which was incompatible with the self-destructive behavior which the subject had sporadically used in the past. At the current time, the subject has not returned to his previous level of correct responding on the "yes-no" concurrent task. He presently performs at a level of 10% to 30% correct on unprompted choices of correct answers when the stimulus is changed from a liked object to a disliked object.

The principal lesson to be learned from this project concerns the reasons why it was not successful. The two main classes of reasons lie in the task structure and unrecognized sensory deficits in the subject. Each will be explored in turn.

During the period of the project, the performance of the subject on a number of other academic tasks had been monitored. During May 1972, the month before the project commenced, the subject was performing errorlessly on decks 1 and 2 of the Russell Perceptual Sorting Kit, and with 20% accuracy (10% is chance, since there are 10 slots) on higher levels such as decks 7 and 11. During April 1973, he has performed these latter decks without errors and has made 1 or 0 errors on decks 43 and 44 of this kit. His competence on these visual discriminations has markedly improved during the year and it appears that complex visual discriminations can be learned by this subject. The subject also appears to be able to categorize common objects by class, since he can perform the sorting required by the association picture cards. Therefore the task structure required by an object discrimination does not seem to be the deficit which caused the poor performance on auditory discrimination tasks.

It is possible that the subject has an auditory deficit that has not been recognized. Nowhere in the history of the subject is there a formal audiometric evaluation. There are informal audiometric evaluations by neurologists, but these evaluations are probably suspect. When he was a young child, the subject babbled for a while, but apparently stopped. He has a very meager repertoire of spoken sounds. The subject also responds to a variety of spoken commands. The fact that he makes correct responses to these commands is somewhat equivocal, since the command "sit down" is frequently given when the subject is standing over his chair, and many other commands have similar contextual cues. His mother reported that he has learned to get spoons to set the table, but that he rarely responds to the similar command to get forks. Thus, there is a variety of evidence that is suggestive of an auditory deficit.

Two things in the experimental history of this subject suggest that an auditory deficit is the cause of the failure of the auditory discrimination. The first has to do with his training for imitation. He mastered gross motor and fine motor imitation skills with relatively little training. However he failed to master vocal imitation. This might be in part due to lingual apraxia which would make the control of the mouth musculature somewhat difficult. However, he currently chews a wide variety of foods, even though he had some history of difficulty in this area. The more recent fact is the history of the failure on the auditory discrimination component of the object identification task. The previously mastered task of the "yes-no" discrimination did not require an auditory discrimination, since the question was always: "Do you like this?", and the discrimination was thus the visual discrimination between the least preferred and the most preferred object, which was an extremely easy discrimination in the preference tests. The nature of the differences in visual pattern that occur during the production of multisyllabic and monosyllabic words has previously been specified. The tasks which the subject has failed on are specifically those which require an auditory discrimination, and so the hypothesis of sensory deficit appears to be tentatively supported.

Bricker and Bricker (1970) presented a flow chart that showed the skills for beginning language learning. They made auditory discrimination a prerequisite for rote receptive vocabulary (essentially equivalent to the auditory discrimination task in this procedure), but they did not indicate

that it was a prerequisite for vocal imitation training. This study suggests that unless other evidence is presented to the contrary, auditory discrimination should also be considered as a prerequisite for vocal imitation.

The premise of this study was that a severely handicapped child might be helped by simplifying the response system required for him to respond to auditory language input. The results of the study indicate that such a sypothesis might or might not still be true. What is apparent is that the subject's undetermined sensory deficits might play a larger role in deciding what modalities to use for input of the stimuli required to be comprehended. If the auditory deficit for this subject is as strong as suspected, a language which only requires other modalities, such as tactile vibrations or signs (such as American sign language) might be the avenue of choice for the further development of linguistic skill in this subject.

CONCLUSION

In order to simplify the language tasks for a profoundly retarded 14-year-old boy with lingual apraxia, a series of procedures for training of receptive language was developed. The procedures included: (1) ranking a variety of objects and foods to determine which were most preferred and least preferred: (2) learning a "yes-no" response based on asking whether the least preferred or the most preferred object was liked, and (3) learning to indicate understanding of the names of objects with the "yes-no" response.

The child was able to indicate those objects that he preferred. He learned to produce a "yes-no" response which was based on his preferences for the objects that are compared. The learning to indicate understanding of names was broken into a component which required telling sounds from each other and learning that names specify a large group of objects. The child failed to learn to tell the difference between sounds.

The child's behavior on a variety of regular classroom tasks was also monitored during the year. He learned to master many novel tasks while he failed to learn to discriminate sounds. The reasons for choosing a simpler form of indicating understanding (receptive language) had eliminated further sensory testing, although an auditory deficit seemed to be the basis for failure to learn language. The receptive language training should be reserved for children who have motor or vocal deficits.

BIBLIOGRAPHY

Baer, D. and Guess, D. Receptive training of adjectival inflections in mental retardates. Journal of Applied Behavior Analysis. 1971, 4, 129-139.

Bereiter, C. and Engelmann, S. Teaching disadvantaged children in the preschool. Englewood Cliffs, N.J. : Prentice-Hall, 1966.

Bricker, W.A. and Bricker, D.D. A program of language training for the severely language handicapped child. Exceptional Children, 1970, 101-111.

Guess, D. A functional analysis of receptive language and productive speech: acquisition of the plural morpheme. Journal of Applied Behavior Analysis. 1969, 2, 55-64.

Izzard, M., Kates, B., Seligman, J., Beesley, M., and McNaughton, S. Brochure on the Bliss symbolics project. Toronto, Ontario: Ontario Crippled Children's Centre, 1973.

Lane, H.L. A behavioral basis for the polarity principle in linguistics. In K. Salzinger and S. Salzinger (Eds.) Research in verbal behavior and some neurophysiological implications. New York: Academic, 1969, 79-96.

Laran, W. and Bricker, W.A. A manual for parents and teachers of moderately and severely retarded children. IMRID Papers and Reports, 1968, 5, No. 22.

Lenneberg, E. Understanding language without the ability to speak: a case study. Journal of Abnormal and Social Psychology, 1962, 65, 419-425.

MacDonald, E.T. and Scholtz, A.R. Communication boards for cerebral palsied children. Journal of Speech and Hearing Disorders, 1973, 38, 73-88.

Premack, D. Catching up with common sense or two sides of a generalization: Reinforcement and punishment. In J. Topp (Ed.) The nature of reinforcement. New York: Academic, 1971.

Schumaker, J. and Sherman, J.A. Training generative verb usage by imitation and reinforcement procedures. Journal of Applied Behavior Analysis, 1970, 3, 273-287.

Tawney, J.H. and Hipsher, L.N. Systematic language instruction. Danville, Ill.: Interstate, 1973.

May 18, 1972

ACTIVITY 16A

(MAKING A "YES" AND "NO" RESPONSE)

A. TASK DEFINITION: "Yes" and "No" are concepts which have a great utility to signal what is happening to a child. He can answer "yes" or "no" to many questions. A child can be tested and/or taught to understand many things if he can use these single responses as signals for what is happening to him.

In this activity you will only teach a child to answer "yes" to questions about liking and disliking things that you know that he likes or doesn't like and to answer "no" to similar questions.

The choices to be taught to the child are:

I (a) You: Show object (most liked thing)

Ask: "Do you like this?"

Child: "Yes"

(b) You: Show object (least liked thing)

Ask: "Do you like this?"

Child: "No"

II (a) You: Show object (most liked thing)

Ask: "Do you hate this?"

Child: "No"

(b) You: Show object (least liked thing)

Ask: "Do you hate this?"

Child: "Yes"

B. PRETEST: To take the baseline for the "Yes - No" response, seat the child in a chair directly in front of you. Take at least 5 objects which have been in the child's classroom or playroom long enough for him to notice them. Then go through each question in part A above at least twice. See if you get consistent responses which indicate either "yes" or "no". The answer may be a head nod, or it may be looking at or looking away, or it may be pushing the object towards him or pushing it away.

If the child fails to pass this test, see if there are any questions which he can answer with a "yes" or "no"

such as: "Are you (his name)?" or "Are you (any other child's name)?" Try other questions based upon your observations. Some other questions might be: "Do you want to go out?" or "Do you want juice?" (The child should answer (yes"). You must also try questions which should get a "no" answer, like "Do you want to have (your hair combed)?"

C. SUGGESTED TEACHING PROGRAM: The Education Program consists of three parts: (1) making an ordered list of things from least liked to most liked. (2) teaching a "yes" - "no" response for the most extreme objects. (3) a test to see that the "Yes" - "No" response works with other things in the list you made.

1. Making an ordered list: Find a list of 10 things (look at part D to find out how to make the list) that the child has had some previous acquaintance or experiences with. Some things should be what the child definitely likes, some he definitely does not like and some for which he shows no particular preference. These things should be toys or things that are durable and can be manipulated. Only include foods as a last resort. Make a list of every pair of things that can be formed. Then present each pair to the child for at least 2 minutes. Present two things to the child on a desk or convenient table in which the child can only play with one of the two objects. Measure the time that the child plays with each by using two stop watches to measure the time. If the child played with one object more than the other, label that object, more and label the other object, less. Do this and label each object of each pair. If the child shows no clear preference, repeat the presentation of the two objects for another 2 minute interval later on.

   When all the pairs of objects have been labeled, find the one object that always comes out "more" over all the others. This is the most preferred object -- label it 1. Take the remaining objects, form a smaller list, and repeat this procedure. Label the most preferred thing as 2.

   Continue this procedure until all 10 objects have been labeled from 1 to 10.

2. Teaching a "Yes" response and teaching a "No" response: Teaching the response requires several steps. The first step is to teach the responses that will be used as "yes" and "no". If you were able to discover anything like a "yes" or "no" response in the pretest, strengthen that response through imitation and reward.

If you did not discover any response, having the child move a small block nearer to him can serve as a "yes" and moving the same block away can serve as a "no" response. To prompt these responses by imitation, you should sit next to the subject while you are doing this, not directly in front of him. The sequence is as follows:

You: "Do this"

You: Move block

Child: Move block

You: Reward child

When the child quickly imitates each movement, for example -- moving the block toward himself for "yes", you should ask him to imitate the other motion, pushing the block away from him.

When the child quickly imitates the "no" movement, you should shift back to the "yes", and reinforce him until he again does this quickly. Then you should shift back and forth as quickly as possible until the child can change each time you request him to imitate you.

The next part of the teaching procedure is to teach the child to respond to the most preferred object with the response for a "yes". The sequence of procedure is as follows:

You: Put object (for instance, a rubber duck) in front of child

Say: "Do you like this?"

Say: "Yes"

Say: "Do this"

Pull block towards you

Child: Pulls block toward him

You: Reward child.

Follow this procedure until the child imitates you quickly. At first make a delay -- about one second. Then you can stop pulling block to you. Whenever he pulls the block towards him before you say "Do you like this?" say a sharp "No" or hold his hand firmly to prevent his moving his hand. Repeat these

procedures until the child pulls the block toward him quickly (usually in less than 2 seconds).

The next part of the procedure is just like the "Yes" response, but you use the least preferred object (e.g., a comb, a tack, or a pin) and substitute pushing away the block for pulling it to the child. Do not expect the child to understand the meaning of "Yes" and "No" until this training is complete.

When the child can answer "no" quickly, switch to having the child answer "Yes" again for about 10 times. When "Yes" is strong, switch back to "No", but do it fewer times. Continue switching until the child easily goes back and forth between the two responses as you change between the thing that he likes and the thing he doesn't like.

Next it is necessary to slowly take away the help you have been giving the child. The child is making the "Yes" and "No" response, but only after you show him. In order to reduce this help, go through the following steps.

Start by making a small delay between the time when you say, "Do you like this?" and when you say "Yes" or "No". Start with a short wait, like one second. You can time one second by saying, "One-thousand-one" to yourself. When you are sure that this doesn't cause any confusion, wait for 2 seconds. This can be done by counting "one-thousand-one, one-thousand-two". The child may begin to make some correct responses even before you say "Yes" or"No". When this happens, do not make the "Yes" responses, but immediately give the child his reward.

If the child makes a wrong response, immediately tell him "No" in a sharp tone of voice and do not give him any reward. Then, for the next trial, repeat the same task, but make the wait (delay) before you say the "Yes" or "No" shorter.

When the child is making most of his responses correctly and before you have a chance to say anything, then this phase of the teaching program has been successful.

3. Testing for general use of the "Yes" - "No" response: Take the next best-liked object (the one you labeled 2 in the first part. Test the child by saying "Do you like it.?" Then, wait for an answer. If the child does not make any answer, go through the same steps that you used in the second part of this education program, but substitute this second-best object. Then, teach the child to alternate it quickly with the least preferred object.

If the least preferred object was labeled 10, the next-to-least preferred object is labeled 9. Present the next-to-least preferred object to the child. If the child does not make a correct answer, go through the same steps that you used to teach the child to respond "No" to the least preferred object but use this second-least preferred object. Then get the child to do this quickly and then switch to the next-to-most preferred object.

Continue these procedures until you come to a natural dividing line where the child himself indicates which things really don't make any difference to him.

D. MATERIALS REQUIRED. Make a list of 10 objects which the child has seen. This list should contain: (1) three objects that the child definitely likes, (2) three objects that the child definitely dislikes, and (3) four objects that you believe the child really doesn't care about. Check your list with someone else who knows the child well. The things you choose should be manipulable objects that you can show quickly. For example, ice cream or other foods are not a good idea; and you can't use his favorite tree house either.

October 2, 1972

ACTIVITY 20A

(LISTENING FOR THE RIGHT WORD)

A. TASK DEFINITION: The purpose of this activity is to teach the child to use his Yes - No response (Activity 16A) to tell you whether he hears the word that names things that are commonly seen and commonly used. When he is done, if you show him the particular truck you have used and ask: "Is this a truck?" he should indicate "yes". Likewise, if you show him a truck and ask, "Is this a boat?", he should answer "No". For this part of the training procedure, we will concentrate on one thing of each type. The child may not generalize the use of "Yes" to new examples of the same kind of object, but he should generalize the use of "No".

Here is a list to go through for the first 10 discriminations of the training program. In the first pair, the discrimination can be made on many bases, including length, and the type of sounds in the words. As the list progresses, the child must listen more carefully to discriminate between sounds.

1.	car	--	record player
2.	milk	--	horse radish
3.	shirt	--	table ("Tay-bul")
4.	man	--	lunch box
5.	coat	--	bag
6.	apple	--	door knob
7.	woman	--	water
8.	dog	--	dish
9.	wagon	--	washcloth
10.	pants	--	paints

The basic choice to be taught includes:

(a) You: Show an object, for example, an apple.

You: Ask "Is this an apple?"

Child: "Yes"

(b) You: Show the same object, an apple.

You: Ask "Is this a ball?"

Child: "No"

B. PRETEST: Use several common things. Say the name of the thing and ask the child: "Is this a ball?" You should use about 10 objects or toys that look like the real thing, or pictures that look like the real thing. You only need one example for each one.

When you have all 10 of them, just take any object and put it in front of the child. Ask all the questions that are appropriate, that is, use the name of the object and the names of one or two objects that are not in front of the child. Go through all 10 objects, in pairs. The child should make 80% correct answers before you consider that he has passed this test.

Some objects that could be used in such a test are:

Wagon	Milk	Shirt	Man	Dog
Car	Apple	Pants	Woman	Cow

C. SUGGESTED TEACHING PROGRAM: This program is for children who give wrong answers or no answer when they are asked: "Is this a _____?"

Start the program by taking one of the 10 objects and place it in front of the child. The object may be a car. Then use the following series of actions:

You: Point to the object (car)

Say: "Is this a car?"

Say: "Car" "Yes" "Do this"

Pull block towards you (to signal Yes)

Child: Pulls block towards him

You: Reward child

Repeat this procedure until the child imitates you quickly. Then, make a short delay between when you say: "Is this a car?" and when you say "car". The delay should only be one second the first time you do it. You can make the delay by counting "one-thousand-one" to yourself. Each time you repeat this, add a second to the delay. Soon, the child should be moving the block before you say "car". In order not to give the child a visual cue about what to do, it is best to hold a hankerchief in front of your mouth while you say the spoken parts of this procedure.

When the child has moved the disk four or five times before you say "Yes" switch to the next procedure:

You: Point to the object (car)

"Is this a record player?"

"Car"

"No"

"Do this"

Push block away

Child: Pushes block away from him

You: Reward child

As you did with the "Yes" procedure, repeat this until the child is quick to give his response. Then delay between "Is this a car?" and "Car" until the child responds quickly.

When the child responds quickly to the question about the record player, switch back to the same question about the car. When the child responds quickly to the question about the car, shift back to the "no" question with the record player as the name. Shift back and forth quickly as you can, but make sure that you never reward a wrong answer or no answer. This training should be continued until the child always gives the right answer, even though you shift back and forth all the time. Hold the child's hand firly or say "No" sharply if he makes a wrong answer.

You can take a post test on this activity by repeating the pretest.

If a child fails to learn this procedure and he has learned the other tasks, you should suspect a hearing problem for speech sounds, although there may be no problem for pure tones. This problem shou d be checked with an audiologist.

ACTIVITY 20B

(UNDERSTANDING WORDS -- ONE AND MORE THAN ONE OF EACH OBJECT)

A. TASK DEFINITION: The purpose of this activity is to teach the child to use his Yes - No response (Activity 16A) to tell you whether he recognizes things that are commonly seen and commonly used. When he is done, if you show him a truck and ask: "Is this a truck?", he should indicate "yes". Likewise, if you show him a boat and ask: "Is this a truck?" he should answer "no". We will concentrate on one and sometimes more than one of each type, so the child should generalize all the objects taught and learn new names readily from hearing them. This activity should be done after Activity 20A, the activity to tell the difference between names of objects pointed to.

The basic choice to be taught includes:

I (a) You: Show an object, for example, an apple.

You: Ask "Is this an apple?"

Child: "Yes"

(b) You: Show an object, for example, a ball.

You: Ask "Is this an apple?"

Child: "No"

B. PRETEST: The pretest requires you to ask the child if each of several common objects is one of those things called by its name. You should use about 10 objects or toys that look like the real thing, or pictures that look like the real thing. You should have two different examples for five objects and only one for the rest.

When you have all ten objects, just take four objects and put them in front of the child. There should be two different examples of one of the objects. (Example: two trucks, one ball, one spoon, and one apple). Ask all the questions that are appropriate, that is, use the name of each object which is in front of him for the object that it names and for one or two objects that have different names. Then ask the names of one or two objects that are not in front of the child while you are pointing at the objects in front of him. Go through all 10 objects, in sets of four. The child should make 80% correct answers before you consider that he has passed this test.

Some objects that could be used in such a test are:

Wagon Milk Shirt Man (doll) Dog (toy)

Car (toy) Apple Pants Woman (doll) Cow (toy)

C. SUGGESTED TEACHING PROGRAM: This program is for children who frequently give wrong answers or no answer when they are asked: "Is this a _____?"

In order to teach this discrimination, set up a display in which there are 4 balls, all of the same size and color at varied distances and positions in front of the child. Change the relative positions at least a little bit each day so that the exact position of an object cannot serve as a cue.

You: Point to one of the four objects (ball)

"Is this a ball?"

"Ball"

"Yes"

"Do this"

"Pull block 1/2 towards you (to signal "Yes" as in Activity 16A)

Child: Pulls block towards him

You: Reward child

Repeat this procedure until the child imitates you quickly. Each time, you should point to a different ball. Then, in a systematic way, make a short delay between when you say: "Is this a ball?" and when you say "ball". The delay should only be one second the first time you do it. You can make the delay by counting "one-thousand-one" to yourself. Each time you repeat this, add a second onto the delay. Soon, the child should be moving the block before you say "Yes".

When the child has moved the block four or five times before you say "Yes", switch to the name of one of the objects in the set for the next procedure (phase 7 -- see page 3-4):

You: Point to one of the objects (a ball)
"Is this a block?"

"Ball"

"No"

"Do this

Push block away

Child: Pushes block away from him

You: Reward child

As you did with the "Yes" procedure, repeat this until the child is quick to give his response. Point to a different object each time. Then delay between "Is this a block?" and "ball" until the child responds quickly.

When the child responds quickly to the question about the block, switch back to the same question about the ball. When the child responds quickly to the question about the ball, shift back to the block. Shift back and forth as quickly as you can, but make sure that you never reward a wrong answer or no answer. Use the correction procedure in Activity 16A. This training should be continued until the child always gives the right answer, even though you shift back and forth all the time.

The next step is to vary either the color or the size of the balls. Decide whether to use color or size from your experience with the child. Use the characteristic (color or size) that the child most readily responds to when he is playing with things that he usually plays with.

If, for example, you choose color, replace one of the balls with a ball that is the same size, but different in color. You should be able to continue the discrimination as before. If, however, the child makes many errors, then start the discrimination over with the changed ball. (Phase 2)

After the child has mastered this discrimination, then include a second different--colored ball. This ball should be different from the other ball with the changed color. Continue the training until the child continues to discriminate. (Phase 3)

Finally, change the color of the remaining two balls and continue the discrimination. (Phase 4)

Next, start to change the sizes of the balls. Begin by replacing one of the balls with a ball of a different color and a different size (for example, a larger ball).

You should be able to continue the discrimination as before. If, however, the child makes many errors, then start the discrimination over with the ball that has been changed in size. (Phase 5)

After the child has mastered this discrimination, then include a second different-sized ball. This ball should be smaller than the original ball if the first changed ball was larger, or vice versa. Finally, change the size and color of the remaining two balls and continue the discrimination. (Phase 6)

Changing relevant characteristics of the discrimination. The next part gradually introduces more difficult parts of the object discrimination. Each feature is introduced one at a time with safeguards that irrelevant characteristics do not become part of the basis for the child's discriminations.

The first step requires a display of 3 balls, all of different colors and sizes and 3 blocks. Each block should approximately match one of the balls in color and size. When you have found the balls and blocks, present them in an unsystematized order to the child. Unsystematic means that: (a) pairs are not together, (b) there is no alternation, (c) balls are not all at the front or the back or on one side or another, (d) there is no other pattern that you can find.

Then, working with the balls only, repeat the discrimination (ball - yes; block - no) that you started with. Do not point to blocks at any time. Next, reverse the procedure, and start from the beginning of this teaching program, only pointing to the blocks. After the child has made this discrimination, then, you must switch between the two procedures (ball -yes, block - no; ball - no, block - yes). At first, make a relatively long run of trials for each kind of object. Then, gradually reduce the length of the sequence of trials with each kind of object. Finally, you should be able to switch back and forth unsystematically from balls to blocks and get the right answer. The right answer, of course, depends on whether you are pointing to a ball or a block. (Phase 7)

After the ball - block discrimination has been established, change one ball or one block at a time to a block either a different color or a different size (not both) while you keep this discrimination going. Then, substitute balls or blocks that vary in size and color simultaneously. (Phase 8)

After the child can keep giving the right answer, even though the blocks and balls are switched frequently, change the relative number of each object. At first, have 4 balls and 2 blocks and keep the discrimination. Then switch to 5 balls and 1 block. (Phase 9)

After the child keeps up the ball - block discrimination, make a display of 3 balls and 3 dolls. The dolls should be all men, all women, all boys or all girls. The 3 balls should be different sizes and colors, and the 3 dolls should match the balls in color and relative size. All these objects should be arranged in an unsystematic fashion. Start with the balls and repeat the discrimination like the one you started with, but make it Ball - yes, and Man (if all the dolls represent men) - no. At first, as in Phase 7, point only to the balls. Then reverse, and point only to the men. Work gradually until you can switch from ball to man quickly. Then change colors and sizes as in Phase 3, Phase 5, and Phase 9 until the child can keep going rapidly. (Phase 10)

After the child keeps up the ball - man discrimination, make up a display of 3 balls and 3 cars or trucks. The colors and sizes of the balls and trucks should roughly match each other. Follow the procedures in Phase 7, Phase 8, and Phase 9 to keep the discrimination going while you change the sizes, colors, and numbers of objects. (Phase 11)

After the child keeps up the ball - truck discrimination well, make up a display of 3 balls and 3 plates or other round flat shapes (circles). The colors and sizes of the balls and the circles should match each other. Follow the procedures in Phases 7, 8, and 9 to keep the discrimination going while you change the sizes, colors, and numbers of objects. (Phase 12)

Follow the rules for Phase 11 or 12 with the following set of objects:

3 balls and 3 apples or 3 oranges or 3 bananas. (Phase 13)

3 balls and 3 hoops (Phase 14)

Generalizing the basis of the object discrimination to other types of objects. In this part, many of the ways of separating the ball from the other objects will be taught by bringing new objects in. The discriminations

required could be:

box - girl

box - cow

box - plate

box - banana

box - wheel

---

boy - motorcycle

boy - circle

boy - pear

boy - cylinder block

---

wagon - ashtray

wagon - grape

wagon - hoop

---

pie plate - watermelon

pie plate - wheel

---

spaghetti - cylinder block